Lucas Busta

1901 Vine St. Lincoln, NE, 68588

+1 (402) 472 0277 • lucasbusta1@gmail.com
lucasbusta.github.io • Updated June 21, 2019

Highlights

NSF Postdoctoral Fellowship in Biology . . . Chemistry & Genomics of Plant Natural Products
CAS SciFinder Future Leader Award . . . . . American Chemical Society Chem. Abst. Serv.
11 yr. research experience . . . . Analytical and (Bio)Chemistry, Molecular Biology, Informatics
6 first-authored publications . . . . . *Phytochemistry*, *Plant Physiology*, *Plant and Cell Physiology*
6 co-authored publications . . . . . *Nature Plants*, *Plant Cell*, *New Phytologist*
9 yr. teaching experience *Guest Lesson Writer & Lecturer, Lab Activity Coordinator, Teaching Asst.*
8 yr. experience with analytical instrument maintenance and repair . . . . . GC-MS, GC-FID

Summary of Research Program & Teaching, Mentoring Philosophy

I am fascinated by the unique chemistry that biological systems use to survive harsh environments. My research uses informatics to unite classical analytical and organic chemistry with emerging high-throughput DNA sequencing technologies to understand the molecular structures, biosynthesis, and evolution of plant chemicals. My goal is to use this approach to develop and apply new knowledge about chemical biology to sustaining and improving human life.

One of the most enjoyable parts of studying plant chemistry is the interdisciplinary nature of the work. This characteristic greatly facilitates the integration of research, teaching, and learning. I consistently strive to bring learners into the laboratory and to bring research into the classroom. As part of this, I take advantage of plants' presence in our everyday lives to develop teaching materials that can be adapted for use both inside and outside the classroom; both in formal, advanced educational settings, and in public, family-friendly events.

Research Experience

2018- ... **NSF Postdoctoral Research Fellow** . . . . . University of Nebraska-Lincoln (UNL)
-*Research area:* Biochemistry and genomics of plant surface chemicals
-*Mentor:* Edgar Cahoon; Professor of Biochemistry; Ctr. for Plant Science Innovation, Dir.
-*Accomplishments:*
Discovered and functionally characterized genes mediating sorghum surface chemistry
Characterized evolutionary patterns in grass surface chemistry and genomics
Developed custom software for high-throughput GC-MS data processing
Developed computational tools to link analytical chemistry and genomics
Created citizen science project to conduct large-scale survey of plant surface chemistry

2016-18 **Postdoctoral Research Associate** . . . . . University of Nebraska-Lincoln (UNL)
-*Research area:* Biosynthesis of fatty acid-derived natural products
-*Mentor:* Edgar Cahoon; Professor of Biochemistry; Ctr. for Plant Science Innovation, Dir.
-*Accomplishments:*
Identified and quantified novel lipid metabolites in plant tissues
Constructed and transformed multigene expression vectors into plants
Discovered and functionally characterized genes controlling the biosynthesis of fatty acid-derived natural products
Wrote software to identify associations between protein sequences and catalytic specificity

2011-16 **Ph.D. Analytical Chemistry** . . . . . University of British Columbia (UBC)
-*Research area:* Diversity and biosynthesis of plant surface chemicals
-*Mentor:* Reinhard Jetter, Professor of Chemistry and Botany
-*Accomplishments:*
Performed detailed chemical analyses of hundreds of plant surface extracts
Chemically synthesized standards for structure elucidation and enzyme assay
Performed comprehensive review of chemical structures and retrobiosynthetic analysis of plant surface chemicals
Developed custom data analysis software to increase throughput, facilitating collaboration with domestic and foreign research groups.

2007-11 **B.Sc. Chem., Biochem. & Molecular Biology** . . . . . University of MN-Duluth (UMD)
-*Research area:* Customized data acquisition software
-*Mentor:* John F. Evans, Professor of Chemistry
Developed custom data acquisition and processing software using LabVIEW
Documented the structure and functionality of developed software in written reports.
Drafted LabVIEW software for spectrophotometric data acquisition and processing.

Teaching and Mentoring Experience

2019 **Guest Lesson Writer and Lecturer** ..... UNL Biochem. 434: Plant Biochemistry
-Series Title: "Biochemistry and Evolution of Specialized Metabolism in Plants"
-Audience, duration: 10 graduate students; 2 lessons, 50 minutes each.
-Role: Created and delivered two lectures based on recent literature (6 papers) describing plant specialized metabolism and the evolution of specialized metabolic enzymes.
-Instructor feedback: "[...] thought-provoking lessons & thoughtfully put together presentations."

2019-... **Mentor to undergradute research assistant** ..... UNL
-Student, duration: Elizabeth Schmitz, ongoing
-Skills taught: High-throughput GC-MS analysis of plant chemicals. Implementation of custom built chromatogram and mass spectrum analysis software. An iterative, critical thinking approach to experimental design and data analysis.

2018 **Guest Lesson Writer, Lecturer, and Lab Activity Coordinator** . UNL Biol. 368: Plants in Human Medicine.
-Series Title: "Analysis of Plant Chemicals"
-Audience, duration: 20 undergraduate students; 9 lessons, 50 minutes each.
-Role: Created and led a two week set of hands-on active learning experiments that model modern phytochemical analysis and research: experiments (phytochemical extraction, thin-layer-chromatography, bioassay, gas chromatography-mass spectrometry) and data analysis (interpretation of data in the context of a group dataset). Co-led a subsequent week of sessions on results communication (conference-style abstract, mini-symposium, and mini-manuscript preparation).

2018 **Guest Lesson Writer and Lecturer** .. U. Wisc.-Whitewater Biol. 351: The Plant Kingdom
-Lecture title: "Plant Metabolism: Why Is It Special?"
-Audience, duration: 20 undergraduate students; 1 lesson, 50 minutes.
-Role: Created and virtually delivered an active learning-centered lecture based on recent literature (6 papers) describing plant specialized metabolism and the function of specialized plant chemicals.
-Student feedback: "Great lecturer", "[...] very interactive.", "He made it relatable [...]"

2018-19 **Mentor to undergradute research assistant** ..... UNL
-Student, duration: Evan Updike, 12 months
-Skills taught: Cloning: digests, PCR, ligation, Gibson assembly, bacterial transformation. Heterologous expression: Arabidopsis, Camelina, transgenic hairy roots. An iterative, critical thinking approach to experimental design and procedures, data analysis, and professional development/career strategy.
-Subsequently: MS student, Cahoon Lab, UNL

2018 **Guest Lesson Writer and Lecturer** ..... UNL Biology 368: Plants in Human Medicine
-Lecture title: "Plant Natural Products in Drug Discovery"
-Audience, duration: 20 undergraduate students; 1 lesson, 50 minutes.
-Role: Created and delivered a lecture based on scientific literature (4 review papers) describing the role of plant natural products in drug discovery.

2018 **Guest Lesson Writer and Lecturer** . . . UNL Dept. of Agronomy and Horticulture R club
-Lecture title: "Data Wrangling in R".
-Audience, duration: 15 graduate, undergraduate students, and postdocs; 1 lesson, 1.5 hrs.
-Role: Designed and delivered a lesson on data processing in the programming language "R" based on the book "Programming in R" by Hadley Wickham.

2018 **Guest Lesson Writer and Lecturer** . . . . . U. Nevada-Reno Biotech. 777: Biotechnology
-Lecture title: "Practical Skills for Graduate Research"
-Audience, duration: 20 graduate students; 1 lesson, 50 minutes.
-Role: Designed and delivered a lecture on professional development and career strategy based on personal experience and advice received over the course graduate career.
-Instructor feedback: "The students really appreciated having Luke as a guest speaker."

2017 **Guest Lesson Writer and Lecturer** . . . UNL Dept. of Agronomy and Horticulture R club
-Lecture title: "Using R to construct and annotate phylogenetic trees."
-Audience, duration: 20 graduate, undergraduate students, and postdocs; 1 lesson, 1.5 hrs.
-Role: Designed and delivered a lesson on constructing and annotating phylogenetic trees in the programming language "R" based on software manuals of four "R" packages (phangorn, ape, ggtree, phytools).

2017 **Guest Lesson Writer and Lecturer** . . . . . UNL Biochem. 435: Plant Biochemistry
-Lecture titles: "The Plant Cuticle" and "Membrane Hemifusions"
-Audience, duration: 12 graduate students; 2 lessons, 50 minutes each
-Role: Designed and delivered a lecture on the plant cuticle based on recent literature describing the topic (4 review papers), as well as a second lecture on membrane hemifusions based on one recent scientific article, per instructor request.

2017 **Mentor to graduate research assistant** . . . . . UNL
-Student, duration: Evan LaBrant, 3 months
-Skills taught: Chemical separation, structural and quantitative analysis by GC-MS (pub. 12). Critical thinking about experimental procedures, data analysis, writing & presenting, and professional development/career strategy.
-Subsequently: PhD student, Roston Lab, UNL

2016 **Guest Lesson Writer and Lecturer** UBC Chem. 319: Practical Skills for Chem. Research
-Lecture title: "Things I wish I'd known before starting research"
-Audience, duration: 20 undergraduate students, 30 minutes, 1 lesson.
-Role: Designed and delivered a lecture on professional development and career strategy based on personal experience and advice received over the course graduate career.

2016-18 **Professional Online Tutor and Lecturer** . . . . . `oneclass.com`
-Audience, duration: 2.2 million undergraduate student subscribers, primarily international students; 4 semesters
-Role: Invited to be an online chemistry and biology tutor and lecturer. Answered students' chemistry and biology questions 1-on-1 via written online interface and delivered virtual lectures (3, 1 hr. each) on general chemistry and biology topics.

2016 **Lecture Course Teaching Assistant** . . . . . UBC Chem. 311: Analytical Chemistry II
-Audience, duration: 90 students, 1 semester
-Role: Designed small-group active learning modules & problem sets. Topics: Properties of light, spectrometry, chromatography, and electrochemistry.

2016 **Co-mentor to undergraduate research assistant** . . . . . UBC
-Student: Cassie McDonald, 5 months
-Skills taught: Quantitative analysis of surface lipids by GC-MS and GC-FID.
-Subsequently: Master's program in Genetic Counseling, UBC

2016 **Mentor to undergraduate teaching assistants**
-Students, duration: Yabin Guo, Kaylyn Leung, 5 months each
-Skills taught: Assisting with upper-level chemistry laboratory courses.

2015 **Laboratory Course Teaching Assistant** . . . . . UBC Chem. 311: Analytical Chemistry II
-Audience, duration: 6–12 undergraduate students, 1 semester
-Role: Instrument operation and usage as applied to practical problems. Gas chromatography - mass spectrometry, fluorometry, cyclic voltammetry, and atomic emission spectroscopy.

2013-14 **Laboratory Course Teaching Assistant** . . . . . UBC Chem. 235: Organic Chemistry II
-Audience, duration: 15 students, 2 semesters
-Role: Basic chemical reactions and work-ups.

2012-13 **Laboratory Course Teaching Assistant** . . . . UBC Chem. 311: Analytical Chemistry II
-Audience, duration: 6–12 undergraduate students, 2 semesters
-Role: Instrument operation and usage as applied to practical problems.

2011-12 **Tutoring Center Teaching Assistant** . . . . . UBC Chemistry First Year Resource Centre
-Audience, duration: 5–10 undergraduate students, 2 semesters
-Role: Tutored general chemistry students

2009-11 **Laboratory Course Teaching Assistant** . . . UMD Chem. 2223: Analytical Chemistry I
-Audience, duration: 20 undergraduate students, 4 semesters
-Role: Helped students conduct experiments related to quantitation, spectrochemistry, and chromatography. Graded exams.

Research Training

2019 **Panel Discussion on Time Management Skills** . . . . . Association of Women in Science
-Focus, duration: Work-life balance as a young professor, 1 hr.
2018 **NSF Broader Impacts Training** . . . . . National Alliance for Broader Impacts
-Focus, duration: How to write a competitive "Broader Impacts" proposal section, 6 hrs.
2018 **Workshop: "Preparing Postdocs to be Professors"** . . . . . UNL
-Focus, duration: Strategies for acquiring an assistant professor position, 1.5 hrs.
2017 **Workshop on Emotional Intelligence in the Workplace** . . . . . UNL
-Focus, duration: Techniques for assessing and improving emotional intelligence, 8 hrs.
2017 **Science Communication and Policy Bootcamp** . . . . . American Institute of Biol. Sci.
-Focus, duration: Effectively communicating science to the public & lawmakers, 7 hrs.
2017 **Metabolomics Workshop** . . . . . Waters Instruments and UNL Center for Biotechnology
-Focus, duration: Sample preparation, data acquisition, processing, and analysis, 9 hrs.
2017 **Social Media and Communicating Science Workshop** . . . . . UNL
-Focus, duration: Effectively communicating science to the public via social media, 2 hrs.
2017 **Workshop on Budget Development** . . . . . UNL
-Focus, duration: How to write a budget for a grant proposal, 2.5 hrs.
2017 **Write Winning Grant Proposals Seminar** . . . . . UNL
-Focus, duration: How to write a successful grant proposal to any agency, 7 hrs.
2016 **Bioinformatics for Evolutionary Biology** . . . . . UBC Biology 525D
-Focus, duration: Ways to learn about evolution using sequence data, 20 hrs.
2016 **R Carpentry Workshop** . . . . . UBC
-Focus, duration: Basics of statistical computing in R, 12 hrs.
2012 **Physical and Analytical Chemistry Seminar** . . . . . UBC Chemistry 540A
-Focus, duration: How to give an effective presentation about analytical research, 24 hrs.
2012 **Principles of Chemical Separation** . . . . . UBC Chemistry 534
-Focus, duration: Theoretical basis for separation chemistry, 72 hrs.
2011 **Bioanalytical Chemistry** . . . . . UBC Chemistry 533
-Focus, duration: Practicing analytical chemistry on biological systems, 72 hrs.
2011 **Advanced Bioorganic Chemistry** . . . . . UBC Chemistry 569
-Focus, duration: Mechanisms by which biological systems catalyze organic reactions, 72 hrs.

Teaching and Mentoring Training

2018 **Mentoring and Advising Workshop** . . . . . CIRTL
-Focus, duration: Strategies for providing quality mentorship to mentees with diverse backgrounds and learning styles, 2 hrs.
2018 **Teaching Portfolio Workshop** . . . . . UNL
-Focus, duration: How to prepare a quality teaching portfolio, 2 hrs.
2017 **Workshop on Teaching Statement Preparation** . . . . . UNL
-Focus, duration: How to prepare a quality teaching statement, 1 hr.
2016 **Instructional Skills Workshop** . . . . . UBC
-Focus, duration: Active and participatory learning and teaching techniques, 24 hrs.
2016 **Writing Across the Curriculum Workshops** . . . . . UBC
-Focus, duration: Literature-based methods for teaching scientific writing, 7 hrs.
2015 **Teaching Assistant Peer-Mentor Training** . . . . . UBC
-Focus, duration: Skills to train others in overseeing lessons, mentorship, and teaching, 6 hrs.
2011 **Teaching Assistant Training** . . . . . UBC
-Focus, duration: Basic skills for teaching assistants in scientific laboratories, 4 hrs.

Funding

2018-... **NSF Postdoctoral Research Fellowship in Biology** ($216,000) ..... *NSF IOS*
-Title: Genes controlling wax biosynthesis in *Sorghum bicolor*: potential for improving crop performance and value.
-Role: Principal Investigator: sole proposal writer, annual report writer, project conception and management, equipment and supplies acquisition, personnel training and management, budget management.

Awards

2019 **CAS SciFinder Future Leaders Award** ($1000) Am. Chem. Soc. Chem. Abstracts Service
-Description: Internationally competitive award, brings awardee to Chemical Abstracts Service headquarters for one week and to American Chemical Society national meeting, includes three-year ACS membership
2019 **Postdoctoral Travel Award** ($300) ..... Phytochemical Society of North America
-Description: Competitive graduate student and postdoc travel award
2018 **Center for Plant Science Innovation Travel Award** ($500) ..... UNL
-Description: Competitive award across plant science labs at UNL
2017 **Associate at Center for the Integration of Research, Teaching, and Learning** ... CIRTL
-Description: Certificate for completing 24 hr. training on active and participatory learning and teaching
2017 **Postdoc Science Slam Champion** ($750) ..... UNL
-Description: 5-minute TED talk-style presentation competition
2017 **ASPB Plantae Fellowship** ($100) ..... American Society of Plant Biologists
-Description: Awardees to oversee components of the plant biology-oriented social media platform `plantae.org`
2017 **F. & M. Loewus Travel Award** ($200) ..... Phytochemical Society of North America
-Description: Competitive travel award
2017 **Best Postdoctoral Poster Award** ($250) ..... Phytochemical Society of North America
-Description: All-society competitive postdoc award, presented in Spanish
2016 **F. & M. Loewus Travel Award** ($200) ..... Phytochemical Society of North America
-Description: Competitive travel award
2015 **Graduate Student Travel Award** ($500) ..... UBC
-Description: Merit-based travel award
2013 **Best Oral Presentation Award** ($250) ..... Phytochemical Society of North America
-Description: All-society competitive student award
2011 **Casmir Ilenda Award for Outstanding Undergraduate Research** ($150) ..... UMD
-Description: Competitive student award
2011 **F.B. Moore Academic and Leadership Award** ..... UMD
-Description: Competitive student award
2011 **Chemistry and Biochemistry Outstanding Undergraduate Teaching Assistant** .. UMD
-Description: Award for exceptional undergraduate teaching assistants
2010 **ACS Undergraduate Analytical Chemistry Award** ..... UMD
-Description: Competitive student award
2010 **James H. Maguire Award** ..... UMD
-Description: Competitive student award
2009 **James H. Maguire Award** ..... UMD
-Description: Competitive student award

Academic and University Service

2019-... **Committee Member** Young Member's Committee, Phytochemical Soc. of N. America
-Role: Organize panel discussion at annual meeting. Nominated by senior society members.
2019-... **Ad hoc reviewer** ..... *Scientific Reports* (I.F. 4.1)
-Role: Evaluate scientific manuscripts submitted for publication.
2019-... **Ad hoc reviewer** ..... *Journal of Integrative Agriculture* (I.F. 1.1)
-Role: Evaluate scientific manuscripts submitted for publication.
2019-... **Scientific Society Member** ..... American Chemical Society
-Role: Attend and participate in scientific meetings.
2019 **Volunteer** ..... Fascination of Plants Day, UNL
-Role, duration: Help high schoolers perform thin layer chromatography separations and learn about polarity, 3 hrs.
2019 **Volunteer** ..... NSF Outreach Day, UNL
-Role, duration: Assist local high school students to separate natural dyes using column chromatography and learn about polarity, 3 hrs.
2019 **Volunteer** ..... Women In Science, UNL
-Role, duration: Assist young women from rural highschools perform thin layer chromatography separations and learn about polarity, 3 hrs.
2018-19 **Committee Secretary** ..... UNL Plant Science Student and Postdoc Society
-Role: Host invited speakers (4), organize workshops (2), host social events (3), coordinate outreach events (1). 40 members. Nominated and elected by peers.
2018-19 **Journal Club Organizer** ..... UNL Lipid Journal Club
-Role: Schedule meetings, coordinate members, book meeting rooms. 10 members.
2018-... **Ad hoc reviewer** ..... *Plant Physiology* (I.F. 6.4)
-Role: Evaluate scientific manuscripts submitted for publication
2018-... **Ad hoc reviewer** ..... *Plant Physiology and Biochemistry* (I.F. 2.8)
-Role: Evaluate scientific manuscripts submitted for publication.
2018-... **Ad hoc reviewer** ..... UNL Undergraduate Research Program Applications
-Role: Evaluate applications for undergraduate research funding (24 1.5-page apps).
2018-... **Ad hoc reviewer** ..... *Functional Plant Biology* (I.F. 2.5)
-Role: Evaluate scientific manuscripts submitted for publication.
2018-... **Ad hoc reviewer** ..... *Lipids* (I.F. 1.9)
-Role: Evaluate scientific manuscripts submitted for publication.
2018-... **Ad hoc reviewer** ..... *Horticulture Research* (I.F. 4.2)
-Role: Evaluate scientific manuscripts submitted for publication.
2018 **Volunteer** ..... UNL Science Museum
-Role, duration: Designed and ran a Saturday morning science activity booth for children where they used plant extracts as indicators to explore the pH of common solutions, 2 hrs.
2018-... **Scientific Society Member** ..... American Society of Plant Biologists
-Role: Attend and participate in scientific meetings.
2018-... **Scientific Society Member** ..... Botanical Society of America
-Role: Attend and participate in scientific meetings.
2017-... **Professional Society Member** ..... National Postdoctoral Association
-Role: Provide input on association decisions via online polls.
2017 **Volunteer** ..... Sunday with a Scientist, UNL Science Museum
-Role, duration: Designed and ran an activity booth for children to explore plant chemistry using starch dyes, thin layer chromatography separations, and microscopy, 4 hrs.
2017 **Volunteer** ..... NSF High School Teacher Workshop, UNL
-Role, duration: Assisted high school teaching visiting the lab in performing molecular biology experiments and gas chromatographic analysis of food products, 4 hrs.

2017 **Volunteer** . . . . . NSF Outreach Day, UNL
-Role, duration: Help high schoolers perform thin layer chromatography separations and learn about polarity, 3 hrs.
2017 **Volunteer** . . . . . Fascination of Plants Day, UNL
-Role, duration: Help high schoolers perform thin layer chromatography separations and learn about polarity, 3 hrs.
2017 **Volunteer** . . . . . Women In Science, UNL
-Role, duration: Assist young women from rural high schools perform thin layer chromatography separations and learn about polarity, 3 hrs.
2017 **Poster Fair Judge** . . . . . Graduate Student Spring Poster Fair, UNL
-Role, duration: Judged scientific posters according to a provided rubric, 3 hrs.
2017-... **Ad hoc reviewer** . . . . . *Plant Cell Reports* (I.F. 3.1)
-Role: Evaluate scientific manuscripts submitted for publication.
2017 **Seminar Speaker Host** . . . . . Dr. Dylan Kosma at UNL Biochemistry Seminar Series
-Role: Prepare schedule, provide transport, introduce at seminar.
2013-... **Scientific Society Member** . . . . . *Phytochemical Society of North America*
-Role: Attend and participate in scientific meetings.

Interviews and Social Media

2018 **Podcast interviewee** . . . . . *In Defense Of Plants*
-Role: Was interviewed for one hour over Skype. The conversation was later turned into a podcast on the popular channel "In Defense of Plants".
2018-... **Scientific Twitter blog writer** . . . . . @PlantsRChemists, #PhytochemicalFriday
-Role: Feature a phytochemical in a Twitter post every Friday, highlighting features interesting to lay readers. >1,100 followers.
2016-... **Scientific blog writer** . . . . . `plantsarechemists.blogspot.com`
-Role: Write blog articles about plant chemistry in plants' and humans' daily lives. Written for the lay reader. >7,000 reads.
2016-... **GC-MS maintenance video channel** . . . . . YouTube
-Role: Prepare and upload detailed, step-by-step videos on how to maintain and repair a GC-MS system. >18,000 views.

Peer-reviewed Publications

2018 [12] **Lucas Busta**, Won Cheol Yim, Evan LaBrant, Peng Wang, John C. Cushman, Patricia Santos, Dylan Kosma, and Edgar B. Cahoon*. "Identification of genes encoding enzymes catalyzing the early steps of carrot polyacetylene biosynthesis" *PLANT PHYSIOLOGY*, 178:4, pp.1507-1521 ..... *I.F. 6.4*
-Role: Structural and quantitative chemical analyses, gene cloning, vector construction, heterologous expression, prepared figures, wrote the manuscript.

2018 [11] Xiangjun Li, Alicen M. Teitgen, Asghar Shirani, Juan Ling, **Lucas Busta**, Rebecca E. Cahoon, Wei Zhang, Zaiyun Li, Kent D. Chapman, Diana Berman, Chunyu Zhang*, Robert E. Minto*, and Edgar B. Cahoon*. "Discontinuous Elongation Generates Novel Fatty Acid Hydroxylation and Seed Oil Functionality" *NATURE PLANTS*, 4: 711- 720 ..... *I.F. 10.3*
-Role: Create phylogenetic trees, edited manuscript.

2018 [10] Yanjun Guo, June Li, **Lucas Busta**, Reinhard Jetter*. "Coverage and composition of cuticular waxes on the fronds of the temperate ferns *Pteridium aquilinum*, *Cryptogramma crispa*, *Polypodium glycyrrhiza*, *Polystichum munitum* and *Gymnocarpium dryopteris*" *ANNALS OF BOTANY*, 122: 555 - 568 ..... *I.F. 4.0*
-Role: Helped analyze, organize data, contributed substantially to manuscript preparation.

2018 [9] Ok Tae Kim, Yurry Um, Mei Lan Jin, Young Chang Kim, Kyong Hwan Bang, Daniela Hegebarth, **Lucas Busta**, Radu Racovita, Reinhard Jetter. "A Novel Multifunctional C-23 Oxidase, CYP714E19, is Involved in Asiaticoside Biosynthesis" *PLANT AND CELL PHYSIOLOGY*, 59(6): 1200 - 1213 ..... *I.F. 4.7*
-Role: Helped analyze data, edited manuscript.

2018 [8] Tongjun Sun, **Lucas Busta**, Pingtao Ding, Reinhard Jetter, and Yuelin Zhang*. "Arabidopsis Transcription factors TGA1 and TGA4 regulate salicylic acid and pipecolic acid biosynthesis by modulating the expression of *SARD1* and *CBP60g*." *NEW PHYTOLOGIST* 217: 344-354 ..... *I.F. 7.3*
-Role: Analyzed amino acid extracts using gas chromatography and mass spectrometry, edited manuscript.

2017 [7] **Lucas Busta** and Reinhard Jetter*. "Moving beyond the ubiquitous: the structural diversity and biosynthesis of specialty plant wax compounds" *PHYTOCHEMISTRY REVIEWS*, 1-30 ..... *I.F. 3.4*
-Role: Performed comprehensive chemical structure searches, literature review, organized large chemical dataset, prepared extensive data tables and figures, wrote manuscript.

2017 [6] Yanjun Guo†, **Lucas Busta**†, and Reinhard Jetter*. "Composition of cuticular wax differs among organs of *Taraxacum officinale*." *PLANT PHYSIOLOGY AND BIOCHEMISTRY*, 115: 372-379 ..... *I.F. 2.7*
-Role: Helped analyze and organize data, identify new compounds, prepare figures, and contributed substantially to manuscript preparation.

2017 [5] **Lucas Busta*** and Reinhard Jetter. "The structure and biosynthesis of branched wax compounds on *Arabidopsis thaliana*." *PLANT AND CELL PHYSIOLOGY*, 58(6): 1059-1074 ..... *I.F. 4.7*
-Role: Analyzed chemical extracts from eight plant lines, identified new chemical constituents and synthesized authentic standards, prepared figures and wrote manuscript.

*corresponding author

2016 [4] **Lucas Busta**†, Daniela Hegebarth†, Edward Kroc, Reinhard Jetter*. "Changes in cuticular wax coverage and composition on developing Arabidopsis leaves are influenced by wax biosynthesis gene expression levels and trichome density." *PLANTA*, 245(2): 297-311 ..... *I.F. 3.3*
-Role: Performed extremely detailed chemical analyses of extracts from various plant lines and tissues of different ages. Prepared figures and wrote manuscript.

2016 [3] Pingtao Ding†, Dmitrij Rekhter†, Yuli Ding†, Kirstin Feussner, **Lucas Busta**, Sven Haroth, Shaohua Xu, Xin Li, Reinhard Jetter, Ivo Feussner, Yuelin Zhang*. "Systemic Acquired Resistance Deficient 4 encodes a key enzyme for pipecolic acid biosynthesis." *PLANT CELL*, 28(10): 2603-2615 ..... *I.F. 8.7*
-Role: Analyzed amino acid extracts using gas chromatography and mass spectrometry, edited manuscript.

2016 [2] **Lucas Busta**, Jessica M. Budke, Reinhard Jetter*. "Cuticular wax coverage on *Funaria hygrometrica* is similar to vascular plants, but wax composition differs between surfaces of the leafy gametophyte, calyptra, and sporophyte capsule." *ANNALS OF BOTANY*, 118(3): 511-22 ..... *I.F. 4.0*
-Role: Performed detailed chemical analyses of surface extracts sent by a collaborator. Prepared figures and wrote manuscript.

2016 [1] **Lucas Busta**, Jessica M. Budke, Reinhard Jetter*. "Identification of β-hydroxy fatty acid esters and primary, secondary-alkanediol esters in cuticular waxes of the moss *Funaria hygrometrica*." *PHYTOCHEMISTRY*, 121: 38-49 ..... *I.F. 3.2*
-Role: Performed detailed chemical analyses of surface extracts sent by a collaborator, identified new compounds and synthesized authentic standards for structural confirmation. Prepared figures and wrote manuscript.

Presentations

2019 **Lucas Busta** "Opening new research avenues by creating links between disparate data repositories." Invited presentation, *SUPERCOMPUTING AND LIFE SCIENCES SYMPOSIUM 2019, THE UNIVERSITY OF NEBRASKA - LINCOLN*, Lincoln, NE.

2019 **Lucas Busta** "Fatty acids: a metabolic starting point for plant chemicals with diverse functions both above and below ground." Invited departmental seminar, *DEPT. OF BIOCHEMISTRY, THE UNIVERSITY OF NEBRASKA - LINCOLN*, Lincoln, NE. Host: Prof. Edgar Cahoon

2018 **Lucas Busta** "Fatty acids: a metabolic starting point for plant chemicals with diverse functions both above and below ground." Invited graduate seminar, *DEPT. OF BIOLOGY, THE UNIVERSITY OF NEBRASKA - OMAHA*, Omaha, NE. Host: Prof. Roxi Kellar

2018 **Lucas Busta**, Won Cheol Yim, Evan William LaBrant, Lindsey Grimes, Zach Wahrenburg, Peng Wang, Patricia Santos, Dylan K. Kosma, Edgar B. Cahoon: "The diversity, activity, and biosynthesis of bioactive polyacetylenes in *Daucus carota*", Oral Presentation, *BOTANICAL SOCIETY OF AMERICA*, Rochester, MN

2018 **Lucas Busta**, Won Cheol Yim, Evan William LaBrant, Lindsey Grimes, Zach Wahrenburg, Peng Wang, Patricia Santos, Dylan K. Kosma, Edgar B. Cahoon: "The diversity, activity, and biosynthesis of bioactive polyacetylenes in *Daucus carota*", Oral Presentation, *INTERDISCIPLINARY PLANT GROUP MEETING 2018*, Columbia, MO †

†co-first authors
*corresponding author
†selected for oral presentation from among poster abstracts

2018 **Lucas Busta** "Phytochemical structures and occurrence across plant diversity as a tool for biosynthetic pathway discovery." Invited departmental seminar, *DEPT. OF BIOCHEMISTRY, THE UNIVERSITY OF NEVADA - RENO*, Reno, NV. Host: Prof. Dylan Kosma

2018 **Lucas Busta**: "Genes controlling wax biosynthesis in *Sorghum bicolor*: potential for improving crop performance and value", Poster, *PLANT GENOME RESEARCH PROGRAM AWARDEE MEETING*, Washington, DC

2018 Nancy Nguyen, Caleb Wehling, **Lucas Busta**, Edgar Cahoon, Wayne Reikhoff: "Defining the mechanism of action of plant-derived polyacetylene antifungal compounds", Poster, *UNL UCARE SYMPOSIUM*, Lincoln, NE

2017 **Lucas Busta** "Now is the most exciting time yet to be a (plant) scientist." Invited workshop presentation, *THE UNIVERSITY OF NEBRASKA - LINCOLN*, Lincoln, NE.

2017 **Lucas Busta**, Evan LaBrant, Lindsey Grimes, Patricia Santos, Dylan Kosma, Edgar Cahoon: "Bioactivity, structure, and biosynthesis of polyacetylenes", Poster, *PHYTOCHEMICAL SOCIETY OF NORTH AMERICA*, Columbia, MO ‡ §

2017 **Lucas Busta**, Evan LaBrant, Lindsey Grimes, Patricia Santos, Dylan Kosma, Edgar Cahoon: "Structure and biosynthesis of bioactive polyacetylenes", Poster, *NEBRASKA RESEARCH & INNOVATION CONFERENCE: PREDICTIVE CROP DESIGN: GENOME TO PHENOME*, Lincoln, NE

2017 **Lucas Busta**, Evan LaBrant, Lindsey Grimes, Patricia Santos, Dylan Kosma, Edgar Cahoon: "Structure and biosynthesis of bioactive polyacetylenes", Poster, *NEBRASKA SYMPOSIUM ON PLANT BREEDING*, Lincoln, NE

2017 **Lucas Busta** and Reinhard Jetter: "Digging for buried treasure in a chemical diversity database", Oral Presentation, *PHYTOCHEMICAL SOCIETY OF NORTH AMERICA*, Columbia, MO

2016 **Lucas Busta** "The diversity and biosynthesis of cuticular waxes." Invited seminar, *THE BOYCE THOMPSON INSTITUTE*, Ithaca, NY. Host: Prof. James Giovannoni (National Academy Member)

2016 **Lucas Busta** "The diversity and biosynthesis of cuticular waxes." Invited seminar, *THE CENTER FOR PLANT SCIENCE INNOVATION*, Lincoln, NE. Host: Prof. Edgar Cahoon

2016 **Lucas Busta**, Reinhard Jetter: "Structure and biosynthesis of branched cuticular wax compounds", Poster, *PHYTOCHEMICAL SOCIETY OF NORTH AMERICA*, Davis, CA

2015 **Lucas Busta**, Jessica M. Budke, Reinhard Jetter: "Cuticular waxes from the leafy gametophyte, sporophyte, and calyptra of the moss *Funaria hygrometrica*", Oral Presentation, *BOTANICAL SOCIETY OF AMERICA*, Edmonton, AB

2013 **Lucas Busta**, Jessica M. Budke, Reinhard Jetter: "Hydroxy esters from the gametophyte, sporophyte, and calyptra of the moss *Funaria hygrometrica*", Oral Presentation, *PHYTOCHEMICAL SOCIETY OF NORTH AMERICA*, Corvallis, OR ‡

2011 **Lucas Busta**, Evan Anderson, John F. Evans: "Development of a Time Domain Reflectometry System for the Determination of Ice Formation on Road and Bridge Surfaces", Oral Presentation, *SPRING UNDERGRADUATE RESEARCH SYMPOSIUM*, University of Minnesota Duluth, Duluth, MN

---

‡awarded

§presented in Spanish

Professional References

Dr. Edgar Cahoon . . . . . Dept. of Biochemistry, Univ. of Nebraska - Lincoln
-*Position:* Professor of Biochemistry, Director of Center for Plant Science Innovation
-*Relationship:* Mentor during postdoctoral work
-*Contact:* ecahoon2@unl.edu; 402 472 5611; 1901 Vine St., Lincoln, NE 68588

Dr. Reinhard Jetter . . . . . Dept. of Chemistry & Dept. of Botany, Univ. of British Columbia
-*Position:* Professor of Chemistry, Professor of Botany
-*Relationship:* PhD supervisor
-*Contact:* jetter@mail.ubc.ca; 604 822 2477; 6270 Univ. Blvd, Vancouver, BC V6T 1Z4

Dr. Sabrina Russo . . . . . School of Biological Sciences, Univ. of Nebraska - Lincoln
-*Position:* Associate Professor of Biology
-*Relationship:* Instructor of "Plants in Human Medicine" course, in which I served as a guest lesson writer, lecturer, and lab activity coordinator
-*Contact:* srusso2@unl.edu; 402 472 8387; 402 Manter Hall, Lincoln, NE 68588

Additional references upon request